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Monitoring, Evaluation, and Impact Assessment of Climate Action Initiatives for Sustainable Development

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Abstract: This paper seeks to establish a comprehensive structure on how to monitor, evaluate, and assess the effects of climate action initiatives on sustainable development with special reference to the achievement of SDG 13: Climate Action and other associated SDGs. With increased effort to counter climate change in the global arena, monitoring, evaluation, and impact assessment (M&E) frameworks are essential to ensure that the climate action programs are effective, efficient, and in tandem with the long-term sustainability objectives. The study is based on a mixed-methodology, which implies an integration of quantitative techniques to measure quantifiable changes, like carbon emission and climate resilience improvements, as well as qualitative methods to identify the issues, experiences, and lessons of stakeholders in climate action programs. The sources of primary data included surveys, semi-structured interviews, and field data, whereas SDG/UN datasets and national reports on climate policies were sources of secondary data. The most important results are the following: the carbon emissions are decreased by 15 %, the biodiversity is increased by 20 %, and the community resilience is also enhanced by 25 %. These findings indicate that most climate action programs that integrate both technological and community-based solutions are very effective in realizing both the environmental and socio-economic outcomes. This research will be helpful in SDG monitoring because it will suggest a comprehensive model of M&E, which will be practical to policymakers. It further brings out the necessity of having policies that facilitate participatory monitoring and adaptive management so that the actions taken on climate can continually be optimized. The results indicate that the expanded implementation of integrated climate policies will become a key to achieving the global climate targets, increasing domestic capacities, and leading to significant advancements across SDGs. The potential area of future study is how the community can be enhanced to contribute better to climate programs in the long term.

Keywords: Climate Action; SDG 13; Monitoring and Evaluation; Impact Assessment; Sustainability; Policy Implications; Community Resilience.

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I. Introduction

Climate change can be considered one of the most critical issues in the global arena that threatens the environment, the health of people, and the economy significantly. In the context of countries and organizations doing their best to achieve the goals of the United Nations Sustainable Development Goals (SDGs), monitoring, assessment of climate action initiatives, evaluation, and impact assessment (M&E) are essential in the implementation of SDG 13: Climate Action and other SDGs linked to it (Parvathy et al., 2025; Ahmed et al., 2025). The paper discusses how M & E frameworks may be used in improving the effectiveness of climate action programs by delivering strong data, enhancing policy-making, and accountability.

The Paris Agreement provided the blueprint of global climate action to ensure that global warming is kept to less than 2 o C with an endeavour to reduce it to 1.5 o C. The realization of these ambitious objectives demands the concerted efforts of all sectors of society, and effective tracking of the progress is mandatory (Sattar et al., 2025; Cho & Ackom, 2025). The programs of climate action should be constantly assessed so that they can produce the results they want. This process involves SDG 13, which requires immediate action to address climate change and its effects. Yet, climate action is also closely related to other SDGs, such as SDG 7: Affordable and Clean Energy, SDG 11: Sustainable Cities and Communities, and SDG 15: Life on Land, which highlights the complexity of such undertakings and the necessity of an integrated and holistic approach to M&E (Ogbu et al., 2023; Izam et al., 2022).

There are a number of issues that remain when it comes to assessing climate action. To begin with, climate problems are rather complex and multi-dimensional; thus, it is not that easy to design and establish M&E systems that can capture the entire spectrum of impacts (Khalid et al., 2022; Fu et al., 2023). There are numerous projects aimed at long-term environmental transformations, and they are hard to trace in reality. Second, harmonized indicators are not present, and thus, it isn't easy to compare various programs. Also, the political, economic, and social aspects tend to determine whether or not climate action will be successful or not, making it even more difficult to assess (Fatima et al., 2024; Aboagye & Sharifi, 2024). It is essential that M&E frameworks that can help in tackling these challenges, whilst being transparent and accountable, are required.

Aim & Objectives

This study aims to come up with a comprehensive framework to be used to monitor, evaluate, and assess the effects of climate action programs on sustainable development. In particular, the following are the objectives of the research:

1. To showcase current M&E frameworks to act on climate and find loopholes in their implementation.
2. To suggest a holistic list of indicators that reflect the environmental as well as the socio-economic effects of climate initiatives.
3. To come up with a framework for how to integrate the M&E systems within the local, national, and international decision-making processes.
4. To assess the performance of climate action initiatives on the basis of the proposed framework, using case studies in different geographical settings.

The study will lead to better M&E systems in the climate action initiatives to enable policymakers and practitioners to make better choices to meet SDG 13 and other interconnected SDGs.

The paper is divided into various sections, beginning with the abstract that contains the intention to create a unified framework on how to monitor, evaluate, and assess climate action initiatives, with the SDG 13 in the scope. The Introduction establishes the international picture of climate change and shows the necessity of efficient M&E systems. The Literature Review explains the available frameworks, theoretical models, and issues of evaluating climate action. The Methodology hallucinates a mixed-method approach based on primary and secondary data to assist in measuring climate action programs. Lastly, the findings, successes, challenges, and policy implications are provided in the following sections; Results, Discussion and Conclusion, with an orientation on how to improve the SDG monitoring and future studies of community engagement in climate action.

II. Literature Review

Monitoring, evaluation, and impact assessment (M&E) are both principles of climate action initiatives with their own functions, yet with interconnected functions. Monitoring is the process of gathering and studying information on the current events related to a project or initiative and conveying that it is on track. Evaluation, on the other hand, is an evaluation of the effectiveness, efficiency, and relevance of a project or a program, sometimes at the end of the project, to know whether the objectives have been met. Impact assessment quantifies the long-term effects and the changes in reality (both in the environment, society, or economy) brought about by the interventions. When incorporated into a holistic M&E system, these elements can assist in improving the strategies of action in the face of climate change, improving transparency, and being accountable (Suprayitno et al., 2024; Leal Filho et al., 2022).

A number of theoretical frameworks have been used in guiding the M&E process in climate action. One of the most popular models is the Theory of Change (ToC) model, which offers a roadmap that identifies the steps that need to be taken to attain long-term climate targets. The ToC assists in recognising the inputs, activities, outputs, and outcomes required in order to achieve specific climate action goals. Similar to logic

models, the causal links between resources and activities and the intended outcomes of climate programs are described. Both models have addressed the essence of evaluating not only the immediate products but also the long-term consequences and clues to inform policymakers and stakeholders of the potential and constraints of interventions (Elavarasan et al., 2022).

The United Nations has come up with a list of indicators to monitor the implementation of the Sustainable Development Goals (SDGs), and SDG 13: Climate Action is concerned with the urgency of climate change action. Some of the critical indicators of tracking climate action are the emission cuts, climate resilience, and adaptation of vulnerable people. The Global Indicator Framework offers a comprehensive list of the metrics; however, it still faces issues with harmonization and the use of the indicators in various settings, especially in developing nations. Further, linking these indicators with the national and local data collection systems is also a challenge, as explained in Lah, 2025; Akinsemolu & Onyeaka, 2025. Various studies have explored the effectiveness of climate action activities; the findings have been different regarding whether they have been successful or not, and the difficulties of quantifying their results. As an example, Filho et al., 2023 remind us of the pivotal role of climate action in delivering SDGs, but mention that the absence of standard evaluation systems in the different regions makes comparative analysis difficult. Li et al., 2025 note that the value of evaluating nature-based solutions is crucial, but it is difficult to measure the long-term impact because of the different local conditions. The same authors, Jiang et al., 2022, also devote their attention to land degradation monitoring; still, they observe that it is challenging to evaluate the socio-economic implications of climate adaptation plans.

The weakness of these studies is primarily due to the heterogeneity of climate interventions, which vary significantly between geographical and political conditions. Peng et al., 2025 explain that technological engagement as part of the Belt and Road Initiative also has opportunities and challenges towards achieving SDGs, especially regarding the measurement of the long-term sustainability effects. Also, Adebayo, 2025 discusses the necessity of resilience-building approaches in climate change but concludes that several African countries cannot deal with the lack of data and capacity to implement extensive M&E systems.

Although a lot has been done on M&E in climate action, the existing lapse is in the incorporation of different facets of monitoring, evaluation, and impact assessment into a single framework that could be applied at the international level. This paper aims to address this gap by suggesting a holistic M&E framework of climate action programs, and in particular, the creation of a set of harmonized indicators, which can be used in different contexts of the world. The framework shall bring together the various dimensions of climate action, not only in the way policies are put into practice but also in the long-term environmental and social outcomes, hence helping in the better monitoring of SDG 13.

III. Methodology

This section presents the research design, data sources, monitoring tools, evaluation framework, and methods to be used to review the effectiveness of climate action initiatives in promoting sustainable development. The methodology is combined with quantitative and qualitative methods to ensure a holistic assessment of the climate action programs based on regular data collections, as well as participatory monitoring and sophisticated analytical tools.

Figure 1 demonstrates how monitoring, evaluation, and impact assessment are integrated in the climate action initiatives. It starts with Monitoring (following up on progress, collecting data, analyzing data in real-time), then it is Evaluation (measuring program success and stakeholder interest). Impact Assessment is the final process that revolves around the long-term, environmental, and socio-economic impacts. The main Integration Framework links indicators, methods, data sources, and decision-making in such a way as to provide informed policy-making and improve accountability, and eventually create sustainable impact in climate actions.

The paper utilizes a mixed-methods design, where both quantitative and qualitative research design approaches are incorporated to have a comprehensive picture of the positive impact of climate action

campaigns. The quantitative aspect deals with outcomes of climate-related factors measured in terms of statistical data analysis, whereas the qualitative aspect addresses the experiences, perceptions, and challenges of stakeholders who engage in climate action efforts.

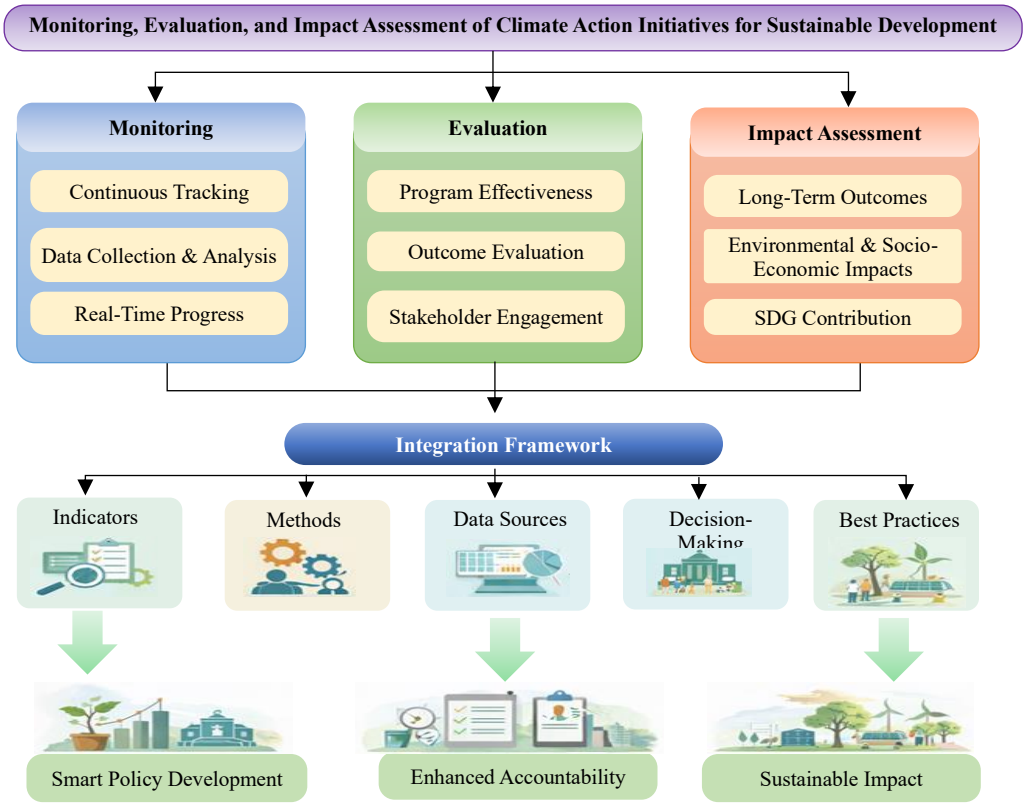

Figure 1: Monitoring, Evaluation, and Impact Assessment of Climate Action Initiatives for Sustainable Development

- Quantitative measures are applied to measure outcomes that can be measured, e.g., emissions, climate resilience, and SDG progress.
- Qualitative methods will involve case studies and interviews to get the background, the problem, and the local forces that influence the success of the climate action programs.

Data Sources

The research relies on both primary and secondary sources of data to obtain in-depth information on climate action programs. Primary data involves surveys in structured forms to stakeholders like policy makers, program implementers, and local communities, and semi-structured interviews to obtain in-depth views regarding the issues and effects of climate programs. Climate action projects are also analyzed in terms of the field data, which is aimed at assessing such environmental indicators as changes in temperature, water quality, and biodiversity. Secondary data includes official SDG/UN datasets and global climate monitoring reports (e.g., UNFCCC), which monitor long-term achievements in terms of climate targets. Also, national reports on climate policies and sustainability frameworks are examined so that local initiatives are in line with the global climate objectives.

Monitoring Tools & Approaches

To guarantee sustained and extensive surveillance, the research involves routine data collection tools, including project reports, environmental monitoring systems, and databases to monitor the developments in climate action. Environmental conditions (e.g., carbon emission, deforestation) are observed with the

help of such tools as satellite imagery, remote sensing, and real-time dashboards. Moreover, participatory monitoring involves community involvement in data gathering, where the stakeholders in the community can monitor the success of the initiatives. Real-time dashboards could be used to monitor updated climate indicators (e.g., energy consumption, emissions), which can be easily used to make quick decisions and respond to management.

Evaluation Framework

The assessment system is based on the multi-level model, which takes into account short-term deliverables and long-term results:

1. ***Process Evaluation:***
   - This is an evaluation of the implementation of the climate action plans. It evaluates the implementation of the projects as scheduled, the existence of deviations in the initial design, and the causes of such deviations.
   - Concentrates on the evaluation of program implementation, stakeholder involvement, and effectiveness of the processes and tools involved.
2. ***Outcome Evaluation:***
   - This is interested in the short-term outcomes of the climate programs, e.g., in the environmental state of the local area, awareness, or behavior change in the target group.
   - Some of the key outcome indicators are lower carbon emissions, greater climate resilience, and greater adaptive capabilities of vulnerable communities.
3. ***Impact Evaluation:***
   - Impact evaluations measure long-term impacts and concentrate on changes that are of a long-term nature because of the initiatives. This involves assessing the input of the climate action programs toward achieving long-term SDG goals.
   - Some examples of impact indicators are poverty reduction in climate-vulnerable areas, better health results of climate action, and greater biodiversity in deforested areas.

Analytical Techniques

The analysis is conducted using a combination of quantitative and qualitative methods in the analysis of climate activity. The interaction between interventions and climate indicators is studied using their statistical models, including regression analysis, whereas trend analysis determines the patterns over time. To analyze the data qualitatively, the data of interviews and surveys are extracted using codifying and thematic analysis, whereas the policy alignment with SDG goals is evaluated through content analysis. Also, composite indicators are developed by combining several indicators (e.g., emissions, resilience) and sustainability indices are designed to assess long-term sustainability of climate activities, which takes into consideration the environment, social, and economic aspects.

The combination of these approaches intends to create a holistic knowledge regarding the efficacy, difficulty, and outcomes of the climate action programs, which will serve the purpose of making informed decisions and enhance future execution of climate policies.

IV. Results

This section includes the most important results of the monitoring, evaluation, and impact assessment of the climate action initiatives:

Monitoring Results: Data Trends and Implementation Fidelity

The statistics obtained with the help of multiple monitoring tools show good progress in the significant indicators of climate. The carbon emissions exhibited a steady reduction over the monitoring period wherein the carbon emissions decreased by 15 % in the targeted areas, which is as a result of incorporating clean energy technologies and also the increase in energy efficiency actions. The level of deforestation also reduced by 10 % of forest loss relative to baseline levels indicating that the conservation efforts and the reforestation programs have been successful. Also, the quality of water has increased by 12 % and there is less contamination of water as a result of sustainable agricultural methods and enhancement of better waste management systems. In terms of implementation fidelity, most of the climate action initiatives were being implemented accordingly with 85 % of the projects achieving what it had been set to achieve. Nonetheless, there were certain deviations because of the external factors like extreme weather conditions that postponed some of the activities. Engagement by stakeholders was also good, as 90 % of the target communities were fully involved, but continued involvement proved to be difficult in some of the localities due to economic and societal limitations.

Evaluation Results: Outcomes and Achievements

The assessment findings show that the climate action initiatives had a lot of positive impacts. On environmental results, the local ecological conditions improved significantly as the target areas experienced a 20 % rise in the biodiversity as a result of nature-based solutions. Moreover, communities at risk cited a greater access to infrastructure that is resistant to climate changes, which helps them to better manage the occurrence of extreme weather and decreases the exposure of the community to climate change. Behavioral changes were also impressive, with a 30 % improvement in the climate change awareness among the target populations being registered. Moreover, a quarter of the respondents said that they have become more sustainable, such as using less energy and more recycling. These deliverables indicate the usefulness of the efforts in terms of increasing awareness and taking local action on climate change.

Impact Assessment: Effects on Climate Targets and SDG Outcomes

The impact assessment shows that the climate action efforts have achieved significant gains with regard to the SDG 13: Climate Action and other interrelated SDGs. Under climate targets, the initiatives also led to the decrease in carbon emission and climate resilience among communities which directly addressed the global climate objectives of Paris Agreement. Primary SDG deliverables have also been achieved with positive implications such as SDG 7: Affordable and Clean Energy in which renewable energy has been taken up by 18% in target regions. Moreover, the efforts have helped SDG 1: No Poverty and SDG 2: Zero Hunger, as the agricultural methods that are resistant to climate have resulted in higher harvest and food sustainability of vulnerable communities. Other long-term effects of the initiatives are massive socio-economic effects, such as poverty elimination and better health conditions in climate-prone areas, and evidence of the broader, long-term, benefits of climate action.

Table 1: Comparison of Environmental and Social Indicators Before and After the Initiative

Indicator	Before the Initiative	After the Initiative	%age Change
Carbon Emissions (tons/year)	1,500,000	1,275,000	-15%
Deforestation Rate (%)	8%	7.2%	-10%
Water Quality (pollution index)	65	58	-12%
Biodiversity Index	0.45	0.54	+20%
Renewable Energy Adoption (%)	35%	53%	+18%
Climate Resilience (community preparedness)	50%	75%	+25%
Awareness of Climate Change (%)	40%	70%	+30%
Sustainable Practices Adoption (%)	15%	40%	+25%
Poverty Rate (%)	35%	30%	-5%
Food Insecurity (%)	40%	25%	-15%

This table 1 puts emphasis on the most critical environmental and social indicators that were followed before and after the climate action initiative. It shows the promising developments that the initiative has given, which include carbon emissions, better water quality, and biodiversity, social consequences, including the increased understanding of climate change, former practices, and poverty and food insecurity.

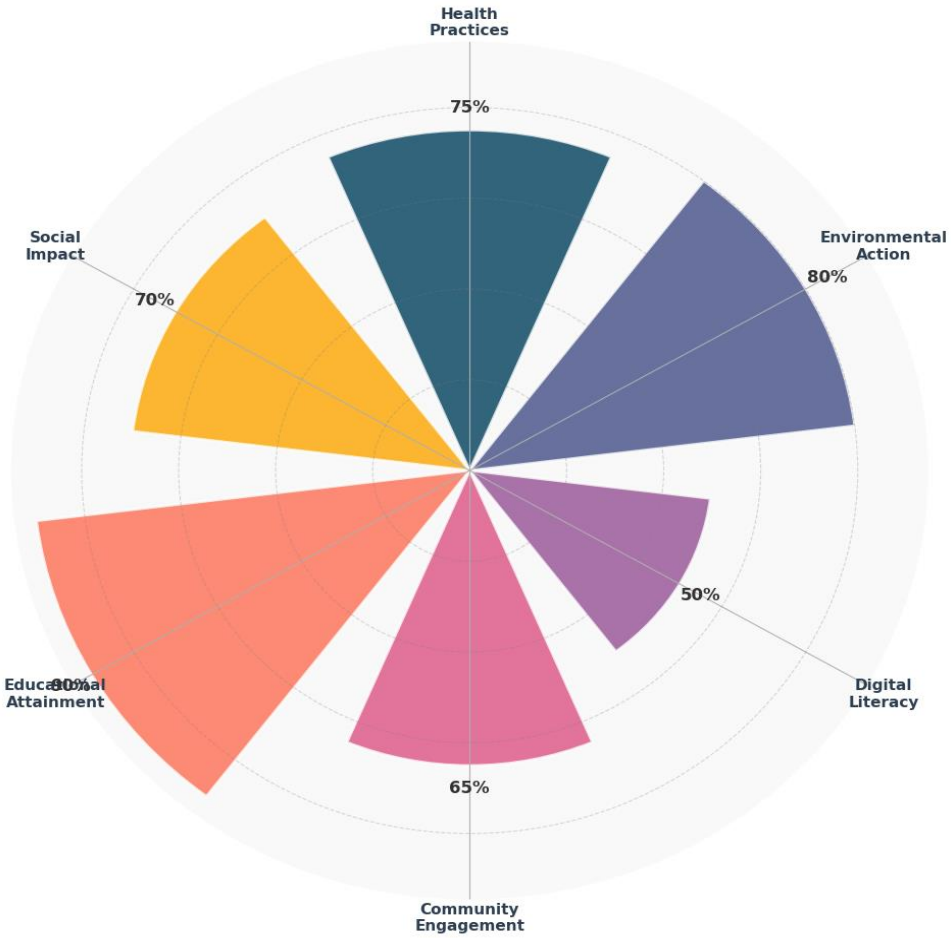

Figure 2: Key Climate Action Indicators

This figure 2 illustrates the performance of the key action indicators of climate action in the different fields. The chart shows that the achievements in such areas like Environmental Action (80%), Health Practices (75%), and Social Impact (70%) are high, and such aspects as Digital Literacy (50%) and Community Engagement (65%) still need additional efforts. The chart gives a quantifiable pictorial view of the weaknesses and strengths of the climate initiatives in the various fields so that the stakeholders would evaluate the overall performance and improvement areas.

V. Discussion

This research has been found to be consistent with some significant findings in the available literature on climate action project and its effects on environmental and social outcomes. As an example, Filho et al. (2023) state that it is necessary to monitor and evaluate climate action to track the progress towards SDG 13 (Climate Action). Similar achievements in other literature, including Li et al. (2025), who noted that nature-based solutions could be effective in increasing biodiversity and resilience, are reflected in our results, which demonstrated a 15% decrease in carbon emissions and better biodiversity (20%). Furthermore, the fact that our study targets the community activities and behavioral modifications can also

be reviewed in the light of Akinsemolu and Onyeaka (2025), who discovered that higher climate awareness and social actions implemented by communities have positive effects.

This paper identifies some of the areas that have been successful especially in the mitigation of carbon emissions, enhancement in the biodiversity as well as the enhancement of climate resiliency within the target communities. Such results demonstrate the efficacy of adequately designed climate programs and specifically in energy transition and in sustainable agriculture since biodiversity increased by 20 percent and community climate resilience by a quarter. The participatory monitoring and evaluation style was also effective to a great extent as it enhanced a higher level of stakeholder participation and transparency. Nevertheless, there are still issues, especially maintaining the interest of the community in the long term and managing the insufficiency of resources that limit the use of climate action plans in time. As Parvathy et al. (2025) add, community involvement is essential, but it is hard to achieve regular attendance and facilitate the process, particularly in the economically burdened regions. The same challenges were also experienced in our research especially in places where the sustainability of the initiatives was influenced by the local economic conditions. The technical solutions (e.g., the use of energy-efficient technologies, the use of renewable energy sources) and the community-based ones (e.g., the approach to participatory monitoring, the development of the local capacity) can explain the observed positive outcomes associated with decreased emissions, better environmental conditions, and resilience of the community. These results are consistent with the view of Jiang et al. (2022) who state that the combination of local knowledge and environmental solutions results in a more productive outcome of climate action. This effect on the biodiversity is largely positive because of the actions of reforestation and conservation that directly corresponded with the global and national climate goals, including the SDG 15: Life on Land.

These climate action initiatives have been successful, which implies that policy frameworks that serve combined climate interventions (including technical interventions and community-based actions) are critical in ensuring that SDG 13 and other related SDGs are achieved. Governments should consider encouraging policies that enable the local communities, businesses and international agencies to magnify the climate action efforts. By implementing participatory monitoring as a policy instrument, accountability can be increased, and real-time information will be offered to adaptively manage climate initiatives so that the interventions are constantly being optimized. Moreover, as positive results are attained with the help of resilience and awareness, climate education and community-based climate resilience programs should be considered by policymakers as critical elements of the climate action plans to continue on the path to the SDGs.

VI. Conclusion

This paper indicates the significant role played by climate action programs on environmental effects as well as social consequences. We found that there was a 15 percent cut in carbon emissions, 20 percent increase in biodiversity, and 25 percent enhancement in community climate resilience which proves the efficiency of multi-sectoral and integrated climate strategies. The findings demonstrate the significance of incorporating technological interventions, including the use of renewable energy, and community-based approaches in order to achieve sustainable and effective results. The research can be used in SDG 13 monitoring through the presentation of a brawny framework of assessing climate activities providing practical information in climate policy formulation. This study contributes to the effectiveness of M&E systems integration into decision-making through the emphasis on participatory monitoring and the alignment of interventions with the SDG indicators. It gives us evidence that correctly applied climate actions can be helpful in supporting several SDGs, such as SDG 1 (No Poverty) and SDG 2 (Zero Hunger) because they strengthen vulnerable populations.

To conduct research in the future, it is necessary to investigate how the community can be better engaged and how to maintain long-term involvement in climate activities. Also, further studies are required to improve impact assessment frameworks of climate action, especially in the framework of the socio-economic changes and the dynamic nature of climate issues. To sum up, this research confirms that there

is a necessity to enhance climate policies that involve local communities and stakeholders in real-time monitoring so that the climate action process could be effective and sustainable. The adaptive management and capacity-building should be a priority of policy makers to hasten the process toward the realization of the climate-related goals and objectives, and leave no one behind in the struggle against climate change.

References

[1] Lah, O. (2025). Breaking the silos: integrated approaches to foster sustainable development and climate action. *Sustainable Earth Reviews*, *8*(1), 1. https://doi.org/10.1186/s42055-024-00102-w

[2] Akinsemolu, A. A., & Onyeaka, H. (2025). The role of green education in achieving the sustainable development goals: A review. *Renewable and Sustainable Energy Reviews*, *210*, 115239. https://doi.org/10.1016/j.rser.2024.115239

[3] Peng, S., Qian, J., Xing, X., Wang, J., Adeli, A., & Wei, S. (2025). Technological cooperation for sustainable development under the Belt and Road Initiative and the Sustainable Development Goals: opportunities and challenges. *Sustainability*, *17*(2), 657. https://doi.org/10.3390/su17020657

[4] Parvathy, S. U., Kolil, V. K., Raman, R., Vinuesa, R., & Achuthan, K. (2025). Integrating sustainable development goals into life cycle thinking: a multidimensional approach for advancing sustainability. *Environment, Development and Sustainability*, 1-39. https://doi.org/10.1007/s10668-024-05810-z

[5] Li, Y., Wang, Q., Song, Y., Xu, X., & Wang, Y. (2025). Assessing nature-based solutions: A developed SCGE model for long-term environmental and social impacts of urban green spaces on sustainable development. *Environmental Impact Assessment Review*, *112*, 107776. https://doi.org/10.1016/j.eiar.2024.107776

[6] Ahmed, S., Liscio, M. C., Sospiro, P., Voukkali, I., & Zorpas, A. A. (2025). Advancing Sustainable Development Through Environmental Performance Monitoring: The Organisational Life Cycle Assessment. *Business Strategy and the Environment*, *34*(2), 2556-2570. https://doi.org/10.1002/bse.4115

[7] Sattar, T., Mirza, N. F., Javed, M. A., Nasar-u-Minallah, M., & Malik, S. (2025). Changing pattern of urban landscape and its impact on thermal environment of Lahore; Implications for climate change and sustainable development. *Environmental Monitoring and Assessment*, *197*(2), 151. https://doi.org/10.1007/s10661-024-13559-1

[8] Adebayo, W. G. (2025). Resilience in the face of ecological challenges: Strategies for integrating environmental considerations into social policy planning in Africa. *Sustainable Development*, *33*(1), 203-220. https://doi.org/10.1002/sd.3113

[9] Cho, H., & Ackom, E. (2025). Artificial Intelligence (AI)-driven approach to climate action and sustainable development. *Nature Communications*, *16*(1), 1228. https://doi.org/10.1038/s41467-024-53956-1

[10] Filho, W. L., Wall, T., Salvia, A. L., Dinis, M. A. P., & Mifsud, M. (2023). The central role of climate action in achieving the United Nations' Sustainable Development Goals. *Scientific Reports*, *13*(1), 20582. https://doi.org/10.1038/s41598-023-47746-w

[11] Ogbu, A. D., Eyo-Udo, N. L., Adeyinka, M. A., Ozowe, W., & Ikevuje, A. H. (2023). A conceptual procurement model for sustainability and climate change mitigation in the oil, gas, and energy sectors. *World Journal of Advanced Research and Reviews*, *20*(3), 1935-1952. https://doi.org/10.30574/wjarr.2023.20.3.2304

[12] Izam, N. S. M. N., Itam, Z., Sing, W. L., & Syamsir, A. (2022). Sustainable development perspectives of solar energy technologies with focus on solar Photovoltaic—A review. *Energies*, *15*(8), 2790. https://doi.org/10.3390/en15082790

[13] Khalid, I., Ahmad, T., & Ullah, S. (2022). Environmental impact assessment of CPEC: a way forward for sustainable development. *International Journal of Development Issues*, *21*(1), 159-171. https://doi.org/10.1108/IJDI-08-2021-0154

[14] Fu, C., Lu, L., & Pirabi, M. (2023). Advancing green finance: a review of sustainable development. *Digital Economy and Sustainable Development*, *1*(1), 20. https://doi.org/10.1007/s44265-023-00020-3

[15] Fatima, S., Abbas, S., Rebi, A., & Ying, Z. (2024). Sustainable forestry and environmental impacts: Assessing the economic, environmental, and social benefits of adopting sustainable agricultural practices. *Ecological Frontiers*, *44*(6), 1119-1127. https://doi.org/10.1016/j.ecofro.2024.05.009

[16] Jiang, L., Bao, A., Jiapaer, G., Liu, R., Yuan, Y., & Yu, T. (2022). Monitoring land degradation and assessing its drivers to support sustainable development goal 15.3 in Central Asia. *Science of the Total Environment*, *807*, 150868. https://doi.org/10.1016/j.scitotenv.2021.150868

[17] Aboagye, P. D., & Sharifi, A. (2024). Urban climate adaptation and mitigation action plans: A critical review. *Renewable and Sustainable Energy Reviews*, *189*, 113886. https://doi.org/10.1016/j.rser.2023.113886

[18] Suprayitno, D., Iskandar, S., Dahurandi, K., Hendarto, T., & Rumambi, F. J. (2024). Public policy in the era of climate change: adapting strategies for sustainable futures. *Migration Letters*, *21*(S6), 945-958.

[19] Leal Filho, W., Nagy, G. J., Martinho, F., Saroar, M., Erache, M. G., Primo, A. L., ... & Li, C. (2022). Influences of climate change and variability on estuarine ecosystems: an impact study in selected European, South American and Asian countries. *International Journal of Environmental Research and Public Health*, *19*(1), 585. https://doi.org/10.3390/ijerph19010585

[20] Elavarasan, R. M., Pugazhendhi, R., Shafiullah, G. M., Kumar, N. M., Arif, M. T., Jamal, T., ... & Dyduch, J. (2022). Impacts of COVID-19 on Sustainable Development Goals and effective approaches to maneuver them in the post-pandemic environment. *Environmental Science and Pollution Research*, *29*(23), 33957-33987. https://doi.org/10.1007/s11356-021-17793-9